What is claimed is:

1. A method of removing contaminants from a fluid column, comprising the steps of:

providing a housing defining an interior chamber established by a fluid impervious boundary wall with an inner surface and having inlet and outlet ports;

providing a pair of electrodes, each electrode comprising a plurality of parallel, spaced-apart plates coupled to a common buss bar and wherein the spacing between the plates is non-uniform;

placing said pair of electrodes within the interior chamber of the housing as opposing electrodes and with the plates of the electrodes being oriented orthogonal to the inlet and outlet ports so that the plates of the electrodes interleave to define a flow path from the inlet port to the outlet port and form a series of cavities of non-uniform volume along the flow path;

introducing a feed stream of contaminants carried within a fluid column to the inlet port of said housing to establish a flow of the fluid column carrying the contaminants through the housing along the defined flow path;

applying electrical energy to the electrodes to produce an electric field that causes contaminants carried within a feed stream to separate from the fluid column; and

discharging as a processed feed stream the fluid exiting from the outlet port of the interior chamber of the housing.

2. The method according to claim **1** further comprising the steps of:

replacing the electrodes; and

disposing of the solidified contaminants.

3. A method according to claim **1** wherein the electrodes comprise an electrically conductive material.

4. A method according to claim **1** wherein the cavities formed between the interleaved parallel plates of the electrodes define distinct contaminant separation units.

5. An apparatus for removing contaminants from a fluid column, comprising:

a housing defining an interior chamber established by a fluid impervious boundary wall with an inner surface and having inlet and outlet ports;

a pair of electrodes mounted within the interior chamber of the housing, each electrode comprising a plurality of parallel, spaced-apart plates coupled to a common buss bar and wherein the spacing between the plates is non-uniform;

said pair of electrodes being mounted within the interior chamber of the housing as opposing electrodes and with the plates of the electrodes being oriented orthogonal to the inlet and outlet ports so that the plates of the electrodes interleave to define a flow path from the inlet port to the outlet port and form a series of cavities of non-uniform volume along the flow path; and

an electric power supply coupled to the electrodes to produce an electric field acting within the series of cavities to separate contaminants carried within a feed stream from a fluid column being directed along the flow path.

6. The apparatus of claim **5** wherein the spacing between the plates is graduated so that the volume of each cavity along the flow path through the housing progressively increases from the inlet port to the outlet port.

7. The apparatus of claim **6** wherein the fluid flow path extends substantially parallel to the surface of each electrode plate.

8. The apparatus of claim **6** wherein the electrodes comprise an electrically conductive material.

9. The apparatus of claim **6** wherein the fluid flow path extends substantially orthogonal to the direction of the electrical field that is established between opposing electrode plates.

10. The apparatus of claim **6** wherein the electrical power supply comprises a direct current source having first and second electrical terminal connections, each terminal connection being coupled to one of the electrodes.

11. The apparatus of claim **5** wherein fluid flow along the flow path is directed around the ends of the parallel plates as fluid flows from one cavity to another cavity.

12. The apparatus of claim **11** wherein fluid flow through successive adjacent cavities goes around the end of a parallel plate of one electrode and then around the end of a parallel plate of the other electrode in a back-and-forth direction across the interior chamber of the housing.

13. A method of removing contaminants from a fluid column, comprising the steps of:

providing a housing defining an interior chamber established by a fluid impervious boundary wall with an inner surface and having inlet and outlet ports;

providing a plurality of contaminant separation sectors, each contaminant separation sector comprising a pair of electrodes, each

electrode comprising a plurality of parallel, spaced-apart plates coupled to a common buss bar and wherein the spacing between the plates is uniform;

placing said plurality of contaminant separation sectors in a substantially coplanar arrangement within the interior chamber of the housing such that the electrodes of the contaminant separation sectors are oriented along planes and in distinct layers;

introducing a feed stream of contaminants carried within a fluid column to the inlet port of said housing to establish a flow of the fluid column carrying the contaminants through the housing along the defined flow path;

applying electrical energy to the electrodes of the contaminant separation sectors to produce an electric field that causes contaminants carried within a feed stream to separate from the fluid column; and

discharging as a processed feed stream the fluid exiting from the outlet port of the interior chamber of the housing.

14. The method according to claim **13** further comprising the steps of:

replacing the electrodes; and

disposing of the solidified contaminants.

15. A method according to claim **13** wherein the electrodes comprise an electrically conductive material.

16. A method according to claim **13** wherein the cavities formed between the interleaved parallel plates of the electrodes define distinct contaminant separation units.

17. A method according to claim **13** wherein said contaminant separation sectors are arranged within the housing to create a flow path therethrough.

18. An apparatus for removing contaminants from a fluid column, comprising:

a housing defining an interior chamber established by a fluid impervious boundary wall with an inner surface and having inlet and outlet ports;

a first contaminant separation sector and a second contaminant separation sector mounted within the interior chamber of the housing, each contaminant separation sector comprising a pair of electrodes, each electrode comprising a plurality of parallel, spaced-apart plates coupled to a common buss bar and wherein the spacing between the plates of each contaminant separation sector is uniform;

said first and second contaminant separation sectors being mounted in a substantially coplanar arrangement within the interior

chamber of the housing such that the electrodes of the contaminant separation sectors are oriented along planes and in distinct layers, the plates of the electrodes interleaving and forming a series of cavities along the flow path from the inlet port to the outlet port of the housing; and

an electric power supply coupled to the electrodes to produce an electric field acting within the series of cavities to separate contaminants carried within a feed stream from a fluid column being directed along the flow path.

19. The apparatus of claim **18** wherein the electrode plates of the first contaminant separation sector are in closer proximity to one another in their uniform spacing than the electrode plates of the second contaminant separation sector in their uniform spacing so that the volume of the cavities in the first contaminant separation sector is greater than the volume of the cavities in the second contaminant separation sector along the flow path through the housing from the inlet port to the outlet port.

20. The apparatus of claim **18** wherein the fluid flow path extends substantially parallel to the surface of each electrode plate.

21. The apparatus of claim **18** wherein the electrodes comprise an electrically conductive material.

22. The apparatus of claim **21** wherein the electrically conductive material comprising the electrode plates of the first contaminant separation sector is different from the electrically conductive material comprising the electrode plates of the second contaminant separation sector so that different electrically conductive materials comprise each contaminant separation sector along the flow path through the housing from the inlet port to the outlet port.

23. The apparatus of claim **22** wherein carbon steel comprises the electrode plates of a first contaminant separation sector.

24. The apparatus of claim **22** wherein aluminum comprises the electrode plates of a second contaminant separation sector.

25. The apparatus of claim **18** wherein the fluid flow path extends substantially orthogonal to the direction of the electrical field that is established between opposing electrode plates.

26. The apparatus of claim **18** wherein the electrical power supply comprises a direct current source having first and second electrical terminal connections, each terminal connection being coupled to the contaminant separation sectors.

27. The apparatus of claim **26** wherein the contaminant separation sectors are connected in series to the electrical power supply.

28. The apparatus of claim **26** wherein the contaminant separation sectors are connected in parallel to the electrical power supply.

29. The apparatus of claim **18** further comprising a static mixing apparatus disposed within the housing in a substantially perpendicular orientation to the direction of flow through the housing.

30. The apparatus of claim **29** wherein static mixing apparatus redirects the flow of a fluid from the internal periphery of the housing to the electrodes of the contaminant separation sectors.

31. A method of removing contaminants from a fluid column, comprising the steps of:

providing a magnetic field generator defining a length of conduit having a fluid impervious boundary wall with an inner surface and an outer surface and having a fluid entry port and a fluid discharge port, a segment of said conduit being encircled by an electrical conductor, said electrical conductor having first and second conductor leads, the electrical conductor being coiled around a segment of said conduit to form a first layer of coiled electrical conducting material and a second layer of coiled electrical conducting material, said layers of a coiled electrical conducting material being disposed coaxially and spaced apart from one another by a pattern of spacers and forming a plurality of open-air cooling ducts between coaxially disposed and spaced apart layers of electrical conductor;

connecting the first and second conductor leads of the electrical conductor to an electrical power supply to produce an electromagnetic field within the inner surface of the fluid impervious boundary wall of the conduit;

providing a plurality of electrodes, each electrode comprising a plurality of parallel, spaced-apart plates coupled to a common buss bar, said electrodes paired to form distinct fluid treatment units;

providing a housing defining an interior chamber established by a fluid impervious boundary wall with an inner surface and having inlet and outlet ports;

placing said plurality of electrodes within the interior chamber of the housing as opposing electrodes, the plates of the electrodes being oriented along parallel planes so that the plates of the electrodes interleave to define a flow path from the inlet port to the outlet port;

introducing a feed stream of contaminants carried within a fluid column to the inlet port of the conduit to establish a flow of the fluid column carrying the contaminants through the conduit;

directing the flow entering the inlet port of the conduit to pass through the electromagnetic field along a path extending through and

substantially orthogonal to each turn of the electrical conductor forming the first and second coil layers;

discharging the fluid exiting from the outlet port of the conduit as a processed feed stream suitable for contaminant separation;

introducing a feed stream of contaminants carried within a fluid column to the inlet port of said housing to establish a flow of the fluid column carrying the contaminants through the housing along the defined flow path;

applying electrical energy to the electrodes to produce an electric field that causes contaminants carried within a feed stream pass flow through the cavities along the flow path substantially orthogonal to the electrical field established between opposing electrode plates; and

discharging as a processed feed stream the fluid exiting from the outlet port of the interior chamber of the housing.

32. The method according to claim **1** further comprising the steps of:

replacing the electrodes; and

disposing of the solidified contaminants.

33. The method of claim **31** wherein the electrical conductor coil layers induce a magnetic field to which fluid passing through the conduit is exposed.

34. The method of claim **31** wherein the supply of electrical power is of sufficient magnitude to induce a magnetic field to fluid passing through the conduit.

35. A method according to claim **31** wherein the electrodes comprise an electrically conductive material.

36. A method according to claim **31** wherein the cavities formed between the interleaved parallel plates of the electrodes define distinct contaminant separation units.